

REMARKS

Applicants thank the Examiner for the thorough consideration given the present application. Claims 1, 2, 7-9, 11, 15, 16, 18, 19, 21-25, 34, 35 and 37-40 are currently being prosecuted. The Examiner is respectfully requested to reconsider his rejections in view of the amendments and remarks as set forth below.

Rejection Under 35 USC §103

Claims 1, 2, 7, 9, 11, 15, 16, 18, 19, and 21-25 stand rejected under 35 USC 103 as being obvious over Ngo et al. (U.S. Published Application 2002/0162736) in view of Wu et al. (U.S. Published Application 2003/0022513). This rejection is respectfully traversed.

By way of the present Amendment, the limitations of claims 5 and 20 have been added to independent claims 1 and 18, respectively. Since this rejection did not include the limitations of claims 5 and 20, Applicants submit that this rejection is overcome.

Claims 5 and 20 stand rejected under 35 USC 103 as being obvious over Ngo et al. in view of Wu et al. and further in Seshan et al. (U.S. Patent 6,352,940). This rejection is respectfully traversed.

Although claims 5 and 20 have been cancelled rendering this rejection moot, Applicants will consider this in regard to claims 1 and 18 which have now been amended to include these limitations.

The Examiner admits that the combined teachings of Ngo et al. and Wu et al. fail to teach the plasma which includes N₂O. The Examiner relies on Seshan et al. to show a method of treating a substrate surface with a plasma having N₂O. The Examiner feels that it would have been obvious to combine the teachings of Ngo et al. and Wu et al. with Seshan et al. to enable the use of N₂O as a cleaning agent. Applicants note that the N₂O plasma treatment disclosed by Seshan causes micro roughening on all of the surface of the oxide layer 28. It is well known in the art that micro roughening at the interface between two materials improves adhesion between these materials (see Col. 6, lines 57-62 and Fig. 9). Thus, the plasma treatment is employed to provide a layer with a rough surface rather than to clean a surface from contaminants. Thus, there would be no motivation to use such an N₂O plasma in the methods disclosed by Ngo et al. and Wu et al. Further, Seshan does not disclose or teach that the N₂O plasma treatment can be used to clean impurities on a metal layer. Accordingly, Applicants submit that there is no motivation to make the three-way combination.

As to the specific claim language, the process described in claim 1 includes the step "treating the exposed first metal layer using an N₂O plasma to remove the impurities thereon." Thus, it is clear that claim 1 not only describes the use of the N₂O plasma, but it also describes the result of the removal of impurities. Since the

Seshan reference clearly does not provide this result, Applicants submit that the combination of references do not teach this claim.

Claim 18 includes the step of "plasma treating the exposed first metal layer using an N₂O plasma to remove the impurities thereon." Thus, Applicants submit that this claim likewise is not obvious over this combination of references for the same reasons recited above in regard to claim 1.

Claims 34, 35 and 37-40 stand rejected under 35 USC 103 as being obvious over Ngo et al. in view of Wu et al. and Huang (U.S. Published Application 2002/0054962). This rejection is respectfully traversed.

Since this rejection was not applied against claim 36 and since the limitations of claim 36 were added to claim 34, Applicants submit that this rejection is overcome.

Claim 36 stands rejected under 35 USC 103 as being obvious over Ngo et al. in view of Wu et al. and Huang and further in view of Seshan et al. This rejection is respectfully traversed.

Claim 36 has now been cancelled rendering this rejection moot. However, since the limitations of claim 36 have been added to claim 34, this rejection will be considered in regard to this claim.

With respect to Huang, a plasma treatment is disclosed to improve the adhesion and oxidation resistance of carbon-containing layers, in which an exposed surface of carbon-containing materials is

treated with an N₂O plasma. However, it should be noted that this treatment is performed on a carbon-containing material rather than a metal layer. Also, this plasma treatment is employed to improve adhesion and oxidation resistance rather than to clean the surface from contaminants. Thus, there is no reason to employ such an N₂O plasma in the methods disclosed by Ngo et al. and Wu et al. since Huang does not suggest the use of an N₂O plasma treatment to clean impurities on a metal layer. Applicants submit that there is no motivation to combine this reference with the other references. Further, as indicated above, Seshan also does not show an N₂O plasma treatment for removing impurities. Accordingly, Applicants submit that even if the four references are combined, they still would not teach the limitations present in claim 34. Further, there would be no motivation to combine the four references together. Accordingly, Applicants submit that claim 34 and the claims which depend therefrom are also allowable.

Conclusion

In view of the above remarks, it is believed that the claims clearly distinguish over the patents relied on by the Examiner either alone or in combination. In view of this, reconsideration

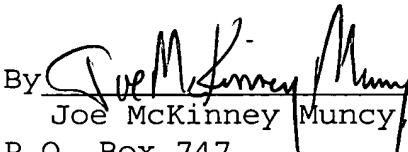
of the rejections and allowance of all the claims are respectfully requested.

Should there be any outstanding matters that need to be resolved in the present application, the Examiner is respectfully requested to contact Robert F. Gnuse (Reg. No. 27,295) at the telephone number of the undersigned below, to conduct an interview in an effort to expedite prosecution in connection with the present application.

If necessary, the Commissioner is hereby authorized in this, concurrent, and future replies, to charge payment or credit any overpayment to Deposit Account No. 02-2448 for any additional fees required under 37 C.F.R. §§ 1.16 or 1.17; particularly, extension of time fees.

Respectfully submitted,

BIRCH, STEWART, KOLASCH & BIRCH, LLP

By 
Joe McKinney Muncy #32,334
P.O. Box 747
Falls Church, VA 22040-0747
(703) 205-8000

 KM/RFG/njp
0941-0841P